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A NEW CRAB FROM THE EOCENE OF FLORIDA

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A CARAPACE of the oxystomatous crab *Calappilia* was collected by the senior author in the summer of 1963 from the Williston Formation, Ocala Group, Upper Eocene, near Citra, Florida. A second specimen referable to this species was collected a few months later from the same horizon in a limerock quarry near

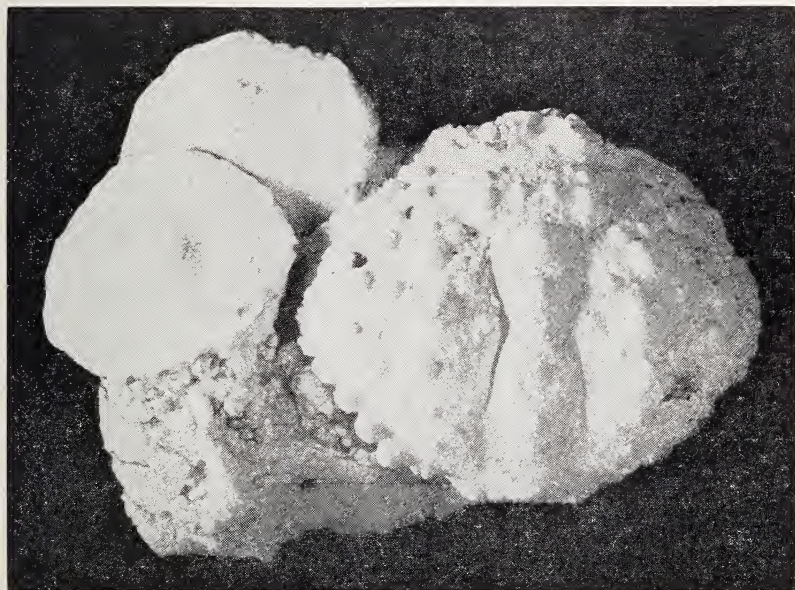


Fig. 1. Dorsal view of carapace of *Calappilia brooksi*, new species. Holotype, U.S.N.M. No. 648599. Disc-shaped foraminiferans at left are *Lepidocyclina ocalana* Cushman. Actual width of specimen 21.9 mm.

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Zuber, Florida. After searching through the Florida State Museum collections at the University of Florida two additional specimens of this species were discovered. Both of these specimens were collected by Dr. Harold K. Brooks. Mr. Henry B. Roberts of the U. S. National Museum, who confirmed the writers' generic designation, pointed out that the specimens represented a new species, and informed us that two specimens of this undescribed species were housed in the Wagner Free Institute of Science collections. These two specimens were loaned to the authors by the Director of the Institute, Robert Chambers, Jr. The seventh specimen referable to this species was collected by the junior author from the same horizon in a limerock quarry about six miles west of Gainesville, Florida.

This is the first reported occurrence of *Calappilia* in Florida, and represents an extension of the known geographical distribution. *Calappilia* is represented in North and Central America by two species, *C. hondoensis* Rathbun (1930), at present known only from the Tepetate Formation, Upper Eocene, of Baja California, Mexico, and *C. diglypta* Stenzel (1934), known only from the Crockett Member of the Cook Mountain Formation, Middle Eocene, of Texas. A third, but unidentifiable species of this genus was reported by Roberts (1956) from the Vincentown Formation, Lower Eocene (?), of New Jersey.

*Calappilia bonairensis* van Straelen (1933) was described from deposits of Upper Eocene Age on the island of Bonaire, Netherlands West Indies. This is the only record of *Calappilia* in the Caribbean or South American regions.

In Europe *Calappilia* is represented by six species and one variety: *C. verrucosa* Milne-Edwards (1873) and *C. sexdentata* Milne-Edwards (1876), middle Oligocene of southwestern France; *C. perlata* Noetling (1885), lower Oligocene of Germany; *C. incisa* Bittner (1886), middle Eocene of Italy; *C. dacica* Bittner (1893), upper Eocene of Hungary; *C. vicetina* Fabiani (1910), upper Oligocene of Italy; and *C. dacica* var. *lyrata* Lörenthey and Beurlen (1929), upper Eocene of Hungary.

In the East Indies *Calappilia* is represented by two species: *C. borneoensis* van Straelen (1923), middle Eocene of Borneo; and *C. bohmi* Glaessner (1929), upper Eocene of Java (see Böhm, 1922).

*Calappilia* is probably restricted, stratigraphically, to deposits of Eocene age although four species are purported, according to

original references, to occur in strata of Oligocene age in Europe. All of the presently known species, other than the four European forms, are found in strata ranging from lower to upper Eocene as indicated above. There appears to be some question, on the part of the writers, that these early European age designations are still correct. Further studies on the European fauna would undoubtedly help to clarify this question.

Institutional abbreviations used in the present paper are as follows: Florida State Museum, F.S.M.; U. S. National Museum, U.S.N.M.; Wagner Free Institute of Science, W.F.I.S.

Family **Calappidae** Dana, 1852

Subfamily **CALAPPINAE** Alcock, 1896

Genus *Calappilia* Milne-Edwards, 1873

*Type Species.* *Calappilia verrucosa* Milne-Edwards, 1873, Middle Oligocene (Rupelian) of Biarritz, southwestern France, by monotypy.

*Calappilia brooksi*, new species

*Diagnosis.* The dorsum is strongly tuberculate and divided into three distinct regions by two longitudinal furrows. The postero-lateral marginal ornamentation consists of seven more or less equidistantly spaced, blunt spines or tubercles decreasing in size anteriorly. The superior orbital margins are armed with three strong, unequal spines. Posterior to the rostrum and just anterior to the juncture of the branchio-cardiac and cervical grooves, the gastric region bears an arc of four tubercles, the central pair being smallest. The anterior branchial region is ornamented with five strong protuberances arranged in a circle surrounding a small tubercle. Two tubercles on the branchial region and three on the hepatic form a second circlet on the dorsum.

*Description.* The carapace is subglobose, convex, broader than long, tuberculate and divided into three distinct areas by two longitudinal furrows. The longitudinal furrows which separate the median from the lateral areas are broad and deep. The fronto-orbital width is about three-sevenths the greatest width of the carapace. The rostrum projects slightly beyond the level of the outer orbital angles; it is poorly preserved on all of the specimens, but it appears to have been moderately narrow with two divergent

points. The orbits are approximately as wide as they are high and slant upward and outwards. The superior orbital margins are armed with three strong, nearly erect spines. The outer pair are convergent and approximately of equal size. The inner spine is about twice as wide as the outer spines, and nearly twice their height. The lower margins of the orbits are not preserved.

The marginal ornamentation consists of somewhat blunt tubercles. The antero-lateral tubercles are small, equi-distantly spaced, directed upwards and gradually increase in size posteriorly. The tubercles on both sides of the carapace, at the widest point, are broken on all of the specimens. The postero-lateral tubercles abruptly increase in size and become more blunt posteriorly. The second and third postero-lateral tubercles are moderately small and broader than long. The fourth is approximately one-third as long as it is broad. The fifth tubercle is as broad as it is long. The third, fourth, fifth and sixth tubercles are more or less equidistantly spaced. The distal end of the sixth tubercle is broken on the holotype, but it appears to have been broader than long. The seventh tubercle is approximately the same size as the second and third tubercles. The posterior margin of the carapace bears only two moderately short, somewhat triangular tubercles. There is no indication of a large spine or tubercle between these two tubercles which may have been either granular or smooth as presented in the reconstruction (fig. 2).

The carapace surface is covered with numerous, high, irregular, domal tubercles and granules. The gastric region of the carapace, posterior to the rostrum and just anterior to the juncture of the branchio-cardiac and cervical grooves, bears an arc of two large and two small tubercles; the two smallest being situated between the larger ones and all being equidistantly spaced. Immediately in front of the two lateral tubercles there are two large granules. Posterior to the arcuate pattern of four tubercles there are three large tandemly arranged tubercles, the most anterior of which has associated with it just anterior and laterally on each side one small granule. The most posterior tubercle is situated in the urogastric region. The cardiac region bears three tubercles and seven granules. The granules surround the most anterior of the three tubercles. The intestinal tubercle is transversely elongated, and situated at each end and anterior to it there is a single granule.

The branchial region bears one circlet of five large tubercles

surrounding a more or less centrally situated small tubercle. The tubercle nearest to the angle formed by the junction of the branchio-cardiac and cervical grooves is the second largest tubercle in the circlet. Anterior to this tubercle there are two small tubercles that parallel the cervical groove. The tubercle below and medial to the above large tubercle is the largest and highest in the circlet. Proceeding outward from the first mentioned tubercle there are two equidistantly spaced, medium sized tubercles, the outermost of which does not belong to the circlet.

In front of the middle tubercle of the abovementioned row of three tubercles there is another medium sized tubercle. A second medium-sized tubercle lies obliquely in front and outward from this latter tubercle. These two tubercles border the branchio-cervical groove and form the posterior border of a second circlet of five tubercles of equal size. The three anterior tubercles of this circlet lie in the hepatic region of the carapace. The two most pos-

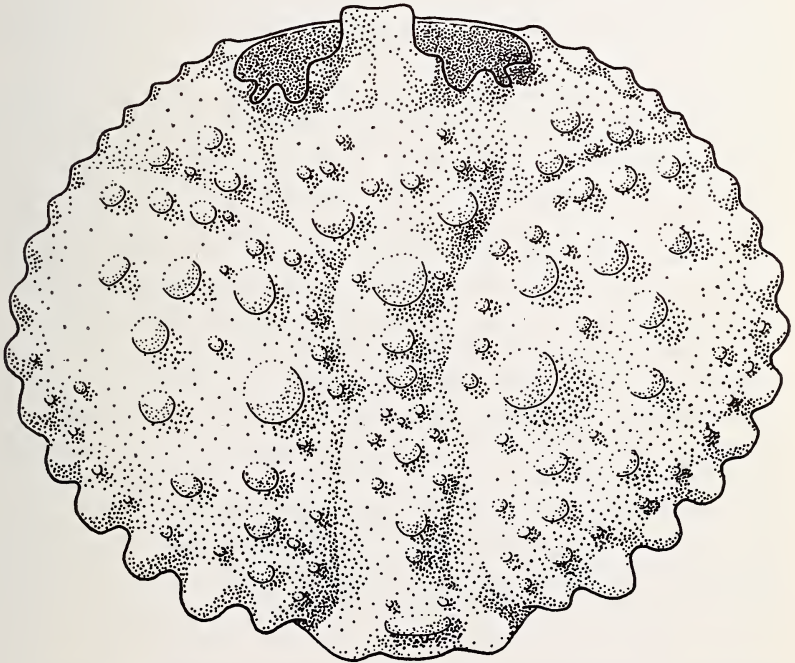


Fig. 2. Reconstructed dorsal view of *Calappilia brooksi*, new species. Drawing prepared by Miss Brenda Baer.

terior of these three also parallel the branchio-cervical groove. The central granule lies midway between these two tubercles.

Posterior to the branchial circlet of tubercles there are four medium-sized tubercles. Three of these are tandemly situated below and outward from the largest tubercle in the circlet. The fourth one is situated laterally from the first one in the row of three.

Bordering the postero-lateral margin of the shell there is a row of granules. These are nearly equidistantly spaced and decrease in size anteriorly.

The undersurface of the carapace is partially exposed on several of the specimens. The antero-lateral wall of the carapace is nearly vertical. In the region of the lateral extremity of the carapace the underside appears to abruptly change from nearly vertical to slightly horizontal. The postero-lateral margin is very sharp and concavely vaulted in the region of the fourth and fifth marginal tuberculations.

There are no traces of the chelae or walking legs. One eye is preserved on the holotype, but not sufficiently to permit description.

*Remarks.* *Calappilia brooksi* is most closely related to *C. hondoensis* Rathbun and *C. diglypta* Stenzel. It may be distinguished from the former species by its two circlets of five tubercles and tri-spinate superior orbital margins. The orbits of *C. hondoensis* appear to be moderately granulate, and the dorsum has one circlet of six large tubercles surrounding a moderately large tubercle. The post-rostral region of *C. hondoensis* has an arc of four tubercles and, "in addition several smaller ones" whereas the present new species possesses two large and two small tubercles and two granules anterior to the outer large tubercles. The cardiac region of *C. brooksi* new species is ornamented with three tubercles and seven granules, the latter surrounding the most anterior tubercle. *Calappilia hondoensis* has one elongate median cardiac tubercle surrounded by eight regularly placed smaller ones. The present new species may be separated from the latter above-mentioned species by the greater number of tubercles, ten of which form two circlets on each side of the dorsum, the tri-spinate superior orbital margins and the lack of a tri-spinate posterior margin. The cardiac region of *C. diglypta* bears only one small tubercle whereas *C. brooksi* new species bears three tubercles and seven granules. The

narrow hepatic region of *C. diglypta* is ornamented with "three small granulate tubercles" in contradistinction to this new species which is ornamented with three small tubercles arranged in a semi-circle surrounding a granule. Four of the branchial tuberculations of *C. diglypta* parallel the branchio-cardiac furrows while a second group of four medium tubercles are arranged in a Y between the aforementioned row and the antero-lateral margin, thus serving to distinguish it from *C. brooksi* new species which has the anterior branchial tuberculations forming a circle.

Two of the specimens in the type series, only one of which is figured (fig. 3e), have larger and better developed tubercles on the carapace, although the number of large tubercles and their position is the same as the remaining specimens. At the present time none of the specimens can be differentiated on the basis of sex. However, it is the authors belief that these small, well tuberculated specimens may prove to be males when more and better preserved specimens become available for study.

*Measurements of Holotype.* Greatest width of carapace 21.9 mm., length of carapace 18.4 mm., approximate height 8.4 mm.

*Measurements of Paratypes.* U.S.N.M. No. 648600, width of carapace 26.2 mm., length 19.9 mm. W.F.I.S. No. 17114a, width of carapace 16.6 mm., length 15.7 mm. W.F.I.S. No. 17114b, width of carapace 22.1 mm., length 18.1 mm. F.S.M. No. 1331, width of carapace 20.5 mm., length 15.1 mm. F.S.M. No. 1332, width of carapace 13.9 mm., length 11.2 mm. F.S.M. No. 1333, width of carapace 15.0 mm., length 12.6 mm. (specimen not here figured).

*Type Locality and Horizon.* Limerock quarry in the S.W.  $\frac{1}{4}$ , sec. 35, T. 13 S., R. 22 E., on the south side of a secondary road about 1.7 miles east of U. S. Highway 301. This unmarked road is approximately 0.9 miles south of the intersection of Florida Highway 318 and U. S. Highway 301, in Citra, Marion County, Florida; Williston Formation, Ocala Group, Upper Eocene; Arnold Ross collector, June, 1963.

*Paratype Localities and Horizon.* Limerock quarry on west side of U. S. Highway 441, N.W.  $\frac{1}{4}$ , sec. 23, T. 14 S., R. 21 E., just south of Zuber, Marion County, Florida; Williston Formation, Ocala Group, Upper Eocene; Arnold Ross collector, August, 1963; F.S.M. No. 1332.

Limerock quarry at town of Haile, sec. 13, T. 9 S., R. 17 E., Alachua County, Florida; Williston Formation, Ocala Group, Up-

per Eocene; Arthur H. Hopkins collector, December, 1952; W.F.I.S. Nos. 17114a and 17114b; Harold K. Brooks collector; F.S.M. No. 1331.

Limerock quarry about 0.5 miles north of Florida Highway 26 and approximately 3.3 miles west of the U. S. Interstate Highway 75 overpass, N.W.  $\frac{1}{4}$ , sec. 35, T. 9 S., R. 18 E., Alachua County,



Fig. 3. Dorsal views of paratype specimens of *Calappilia brooksi*, new species. *a*, W.F.I.S. No. 17114a, actual width of specimen 16.6 mm. *b*, F.S.M. No. 1331, actual width of specimen 20.5 mm. *c*, U.S.N.M. No. 648600, actual width of specimen 26.2 mm. *d*, W.F.I.S. No. 17114b, actual width of specimen 22.1 mm. *e*, F.S.M. No. 1332, actual width of specimen 13.9 mm.



Florida; Williston Formation, Ocala Group, Upper Eocene; Harold K. Brooks collector, 1961, U.S.N.M. No. 648600; R. J. Scolaro collector, March, 1964, F.S.M. No. 1333.

*Type Depositories.* The holotype and one paratype are deposited in the collections of the U. S. National Museum, catalogue numbers 648599 and 648600, respectively. Two paratypes are deposited in the Wagner Free Institute of Science collections and are numbered 17114a and 17114b, respectively. The remaining three paratypes are deposited in the Florida State Museum collections at the University of Florida, catalogue numbers 1331, 1332, and 1333.

*Etymology.* The authors take great pleasure in naming this new species in honor of Dr. Harold K. Brooks, Curator of Invertebrate Paleontology, Florida State Museum.

#### ACKNOWLEDGMENTS

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